Zoox Incorporated: The Acquisition by Amazon

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Zoox Inc., a young company with the goal of making the next generation of mobility for riders - not drivers, via the creation of autonomous mobility from the ground up and sharing it through it's independent ride sharing platform, undoubtedly suffered from the COVID-19 pandemic. This pandemic shifted Zoox's future expectations in terms of funding and technological advancements which made the company, valued at $3.2 billion just months before being purchased by Amazon, to sell for less than half of that amount.

On one hand, investors received the acquisition of Zoox for a sum of $1.2 billion dollars as a horrible return to investments after the company managed to get almost $1 billion dollars in funding from investors in just 6 years. On the other hand, Tim Kentley Klay, Co-founder of Zoox, couldn't hide his happiness in his personal Twitter account where he wrote, "It's official - Zoox's days are to be measured in decades! Welcome to the party and ride of your life @JeffBezos and @Amazon! Go team!! Go @Zoox!!!."

Similarly, many in the public questioned Amazon's decision to acquire Zoox, while others started to predict what was Amazon's intention with this purchase. The ones that objected to Amazon's decision argued that the company was doomed to fail either way, and Amazon just gambled their money away, while the ones that praised Amazon's acquisition stated that it was another step taken by the company to build its empire.

The Company

Prior to co-funding Zoox, Dr. Jesse Levinson, son of Apple Inc. chairman Arthur D. Levinson, completed a computer science Phd at Stanford. It was there where he leaded and developed algorithms for Stanford's team that went on to win a $1M prize after obtaining second place in the 2007 DARPA Urban Challenge, a competition that required teams to create an self-driving cars that were able of driving in traffic and performing complex maneuvers such as passing, merging, negotiating intersections, and parking. However, it wasn't until 2014, that Dr. Levinson stopped engineering the autonomous driving technology at Stanford, and co-founded Zoox Inc. with Melbourne born entrepreneur, Tim Kently-Klay, an artist with no technical background in computing.

The uncommon name of the California based, Zoox, references the organism Zooxanthellae (a colloquial term for single-celled dinoflagellates) , which was inspired due to the cell's dependence on renewable energy like that of Zoox and its symbiotic relationship with other living things such as coral reefs that relates to the original goal of the company: to have a symbiotic relationship with consumers.

The start-up, at a time where interest of investors in self-driving technology, sold itself to investors as a company that would revolutionize the world with its all-in-one package, custom made autonomous electric vehicles (EV) that would run on Zoox's ride sharing platform. This made the company enjoy prosperous early years. By early July 2015, the company had received its first seed

investment worth $40 million from two venture capital companies. Less than one year later, the Zoox Inc. raised another round of funding for an undisclosed amount that sky-rocketed the company's valuation to $1.55 billion.

In 2018, the company had already around 500 hundred employees, with tens of coding experts, AI researchers and software engineers. For roles that didn't need software or hardware expertise, the company relied on third-party staffing agencies that supplied Zoox with workers for a variety of roles such as car cleaners and safety drivers for their more than 50 registered test vehicles in California's and Las Vegas' public roads. This enabled the start-up to keep its costs down, while at the same time getting some legal space between the company and some of its labor force.

Silicon Valley received the first alarm bell from this company in August 2019; by that time, the company had more than 700 employees and was valued at $3.2 billion after completing a $500 million funding round. Co-founder Tim Kentley-Klay was relieved of his duties as the CEO of the company, to the amazement of the outside word and Tim himself, that made his feelings clear through his personal Twitter account:

> " I came to this town as a founder only to build the future of mobility, and by metrics shared here was crushing it against the biggest. But the shocking reality is that this morning - without warning, cause or reply - the board fired me. Rather than working through the issue in an epic startup for the win, the board chose a path of fear, optimizing for a little money in hand at the expense of profound progress for the Universe. Cheers to the true believers that have built Zoox from scratch over the last four years. Don't let anyone stand between you and what you know is right. TKK."

The secretive company didn't release any official statements, but it was suspected that board members, which includes a number of Silicon Valley heavyweights, didn't like Tim's strong convictions, non-technical background and the way he sold Zoox to investors.

His place was rapidly taken by Aicha Evans, who joined Zoox after a successful spell as chief strategy officer in Intel. In her own words, Ms. Evans, an engineer born in Senegal and raised in France, 'was attracted by Zoox's focus on urban services and its approach to building a vehicle rather than retrofitting cars made for drivers into driverless vehicles'.

By the removal of Mr. Kentely-Klay, one thing was clear, the company would need much more funding to make its promise to investors a reality. This task would result harder than ever due to rising skepticism from investors, increased interest from potential investors in autonomous project pursuit by bigger names such as General Motors and Wayno, in addition to new market trends that made investments into autonomous driving less appealing to investors.

The first months of Ms. Evans in command were promising for Zoox, but the company's financial issue escalated rapidly back again with the emergence of the virus COVID-19 in California, which dried up all the inflows the company received. The company acknowledged this issue for the first time in May of 2020 when they released a statement stating to have 'logistical and financial challenges to our operations' that would make them 'stop payment of contractors beyond April 7th if they are unable to

work remotely.' The statement also made clear that the decision was caused due to the uncertain economic climate:

> 'This decision was not made lightly, and is an unfortunate reflection of the difficult situation faced by many organizations in an uncertain economic climate.'

Things got worse as the COVID-19 pandemic worsened in California. By April 2020, at least 87 Zoox workers received an email from their employer that informed them that their jobs were being terminated immediately. However, the email also said that the company would attempt to hire the affected workers back "once the shelter in place is lifted, unless stated otherwise." Nevertheless, some of the employees affected by Zoox's decision when interviewed in a local news site showed their concerns."It would be amazing if Zoox brought everyone back, but I'm doubtful,"one worker said. Another stated "That just sounds like they are all fired to me."

In late April 2020, voices, inside the company, began to appear stating that the only way the company will survive was if it was bought by another company, given that investments dried up due to the pandemic. All voices pointed out that the e-commerce giant, Amazon, was interested but nothing was yet confirmed by Zoox's board members.

With an unclear future, rival companies approached various of Zoox's engineers and many took the offers like two of Zoox seniors engineers, James Philbin and Marc Wimmersof, who joined Waymo, Alphabet's driving unit.

By early June 2020, Zoox had signed an exclusive agreement to negotiate with Amazon, but some days later, another of Zoox's competitors, Cruise, approached the company with a $1.05 billion dollars offer, which Zoox rejected.

Shortly after, an agreement with Amazon was reached for $1.2 billion dollars with the company offering $100 million extra in stock awards to keep Zoox's employees from leaving. The purchase came at a bargain when compared with the $3.2 billion dollars valuation given to Zoox just months prior to the acquisition.

Electric Vehicle Market

By 2020, although it was recently accessible to the masses, EV technology was fairly old. Automobile manufactures had already invested heavily in EV technology to be prepared for the inminential transition from internal and external combustion engines in cars. These heavy investments in conjunction with the driving factors given below had made the production of vehicles that use one or more electric motors for propulsion powered by self-contained batteries to convert fuel to electricity, a must for all companies that want a stake in the future car industries.

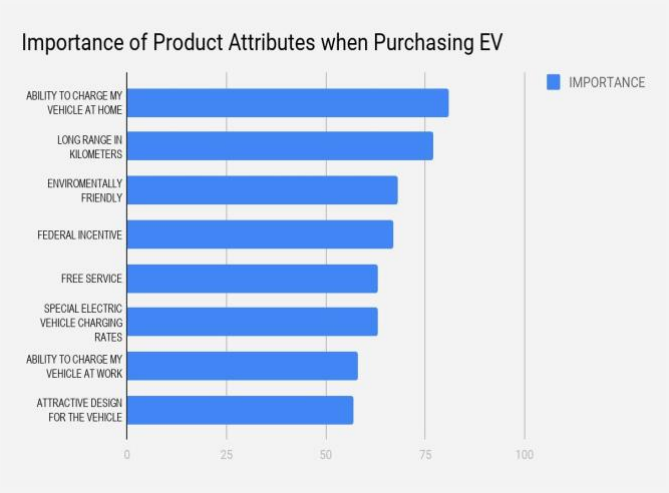
Factors Driving the Market

- Technology
    - In the last two decades, huge technological advances have been made that have enabled the creation of batteries that are more efficient and cost-effective when powering an automobile. Moreover, the components used to build these batteries keeps improving, the average energy density in these batteries is increasing at a rate greater than 4% per year. Furthermore, charging speeds for these batteries are also rising rapidly fueled by private and public research and development. ● Rising Environmental Awareness
    - Studies conducted in 2015 showed that 68% of Americans are said to be concerned about the damage that human practices inflict on the planet. This study also showed that the number of concerned individuals from 2009-2015 had risen every year by around 5%.
- Policy
    - As of 2020, 13 countries and 31 cities have announced plans to phase out the usage of internal combustion engines. In some cities such as Los Angeles, California, these policies had also translated into subsidizing the purchase of EV.
- Economics
    - It is estimated that by 2025, EV will reach price parity with traditional combustion engine cars in most market segments of some geographical regions such as North America and Europe.
- Fall in Commodity Prices
    - Lithium, a vital commodity needed as an input for the creation of long-lasting and high-energy density batteries has experienced a price drop in the last two decades as a result of technological advances in the extraction of the mineral and new deposits of lithium being found in countries like Mexico and Argentina. Consequently, the prices for lithium-ion battery packs have fallen by 87% since 2011.

<u>Consumer segment</u>

All of the factors explained above have not only accelerated the penetration of EV in the consumer segment (Exhibit 4 and 5), but have also become relevant key factors in the consumer's purchase decision (Exhibit 1).

Exhibit 1



Key Players

As mentioned earlier, there are many firms spearheading EV's manufacturing and EV's technological innovations. Among all of them, the companies that in 2020 are dominating the EV market are Tesla (US), BMW (Germany), BYD (China), Nissan (Japan) and Volkswagen (Germany). Most of their dominance can be vastly attributed to possessing strong distribution networks and offering an extensive product range targeted at different product segments.

Tesla (US) is widely regarded as the company that is leading this race due to its innovation and focus on research and development. Its current strategy can be summed in two imperative points: the urgent need for an economically sustainable zero-emissions transportation and creating higher value for its customers through technological innovation. The company's urgent need to create economically sustainable zero-emissions transportation has propelled them to become the innovators from an innovative industry, this is exemplified by their continuous pursuit of offering EV with longer mileage-range, in addition to targeting different market segments with different products at different price-ranges. Tesla, in addition to creating higher value for its buyers with product evident features such as semi-autonomous driving, has also simplified the buying process of cars putting the consumers in control.

It's important to remark that most of the dominant players in the EV industry also have an important stake in the innovation of autonomous driving technology.

Autonomous Driving Market

The leading cause of death in the U.S. for ages between 1 and 54 is road crashes with more than 38 thousand people dying in U.S. roads each year due to road crashes (ASIRT, 2020). Autonomous vehicles or self-driving vehicles not only have the potential to reduce road crashes but can also enable the independent mobility for individuals suffering from certain disabilities, non-riders, increase road capacity, reduce costs of transportation and allow drivers to become riders. Because of this, many governmental institutions are taking initiatives to launch autonomous vehicles (AV) in their countries. All of this translated into the future growth of the market (Exhibit 6).

Competitors

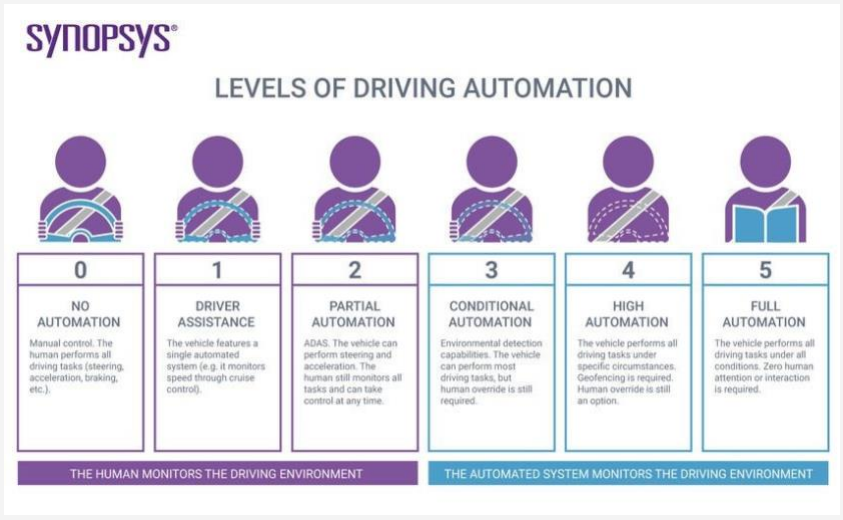
As of 2020 there are over 40 different companies who are either testing self driving automated cars or are planning to enter the market in the next few years. From these companies the top 5 are Tesla, Google's Waymo, GM's Cruise, Ford's Argo AI, , and Baidu (in China).

Tesla

Tesla has managed to have more vehicles on the road actually capable of advanced levels of autonomy than any other car manufacturer. However Elon Musk, Tesla's CEO and founder, has been very vocal about not using light detection and rangin g navigation technology (LiDAR) in his cars. Even though nearly every other company developing self-driving vehicles uses it. Instead Tesla uses ultrasonic, radar, and 2D camera devices. "Anyone relying on LIDAR is doomed. Doomed. LiDAR is expensive sensors that are unnecessary. It's like having a whole bunch of expensive appendices. In cars, LiDAR is freaking stupid… as Tesla's AI director Andrej Karpathy was saying, once you solve vision, it's worthless."Elon Musk has stated. Tesla has over 600,000 Tesla vehicles on roads all around the globe, collectively having driven over 3.2 billion kilometers (2 billion miles). Thus Tesla has built up a

considerable level of experience with many autonomous features (SAE Level 2 and lower for most vehicles but with prototype cars reaching Level 5) that's more advanced than others in the car industry. Moreover, in 2019 Musk made a promise that before 2020 was over there would be at least one million completely autonomous (SAE Level 5) Teslas on the road. However to achieve that Tesla would have to increase their 2019 levels of production by more than double.

Exhibit 2



Waymo

Waymo, Alphabet's (parent company of Google) driving subsidiary, when measured by the quantity of vehicles operating is by far way ahead of any other competitor. The number of KMs driven (about 32 million on the roads and over 16 billion in simulation) and the sophistication of their AI gives them a huge advantage in terms of both technology and experience. In addition to having cameras, radar sensors, and LiDAR technology , the cars also make use of microphones to detect sirens from emergency vehicles. Waymo currently operates a fleet of Society of Automotive Engineers (SAE) Autonomy Level 4 (Exhibit 2) automated taxis in Phoenix, Arizona called Waymo One (most of these have a backup driver upfront). The testing of prototype fully driverless SAE Autonomy Level 5 (Exhibit 2) cars is taking place simultaneously. The city of Phoenix was selected for the taxi service for its convenient and ideal conditions of both weather and traffic as compared to other cities around the world. However, to not be dependent on only one set of conditions for testing, Waymo has set up testing locations in Michigan and California for their vehicles to get used to winter climates and conditions. Waymo has signed many partnerships with different traditional car manufacturers like Volvo, Land Rover, Fiat Chrysler and Jaguar, with other Tech companies like Intel, and with retailers and distributors like Autonation and Avis.

Argo AI

Founded by two experienced engineers from Google and Uber self-driving programs Argo AI has since tested with a 100 vehicles in at least six different cities in the US so far. Their testing vehicles are modified versions of the Ford Fusions. Ford had invested $1 billion in 2017 and became a majority shareholder in the company but technically it's still run as an independent venture. The firm has also received a $2.6 billion investment from Volkswagen, the world's largest car manufacturer. However,

unlike other firms Argo AI does not have an initial goal of producing its own cars but instead manufacture self-driving technology to be used by other companies, such as taxi or delivery services. Eventually they expect to use the resources from Ford and VW to manufacture self-driving cars for consumers. "In a very short period of time, we've been able to basically put the system at a level of maturity far beyond what other companies of our age have been able to do," says NickTwork, the Senior Communications Counsel for Argo AI.

Cruise

Cruise just like Zoox was an independent self-driving car company but in March of 2016 it was acquired by GM. Since then they have grown exponentially and currently have the world's second-largest number of automated cars undergoing testing, about 180 vehicles. They've driven over 1.6 million kilometers (1 million miles). Most of these cars look like standard Chevrolet Bolt hatchbacks and have been fitted for complete autonomous driving. "Unlike other autonomous vehicle companies, being deeply integrated with one of the world's largest automakers like General Motors positions Cruise to manufacture self-driving cars on an assembly line in Orion, Michigan, which is capable of producing hundreds of thousands of vehicles per year," says GM Cruise Vice President Mo ElShenawy. GM's 111-year experience in car manufacturing gives them a strong competitive advantage over most of the other players. Tech companies such as Apple, Google and others may have a stronger edge from a superior AI but they actually have very little experience dealing with real-world road endurance.

Baidu

Baidu is China's version of Google and they also started out with a search engine but soon they started to branch out into other industries.They have over 300 autonomous test vehicles driving around on Chinese roads and have driven over 3 million kilometers (1.8 million miles) in 23 cities. The market for self driving vehicles in China is estimated to be worth around $500 billion as of 2030. Baidu has partnered up with Chinese carmaker FAW Group and also has signed agreements with various other Chinese auto manufacturers such as BAIC, King Long Motor Group, JAC Motor, and NIO. Just as Waymo is doing, Baidu has launched a 45-car Taxi service to demonstrate and also test its cars in the city of Changsha located in China's Hunan Province. These vehicles will have a driver present in the car but they will not be actively driving thus operating at SAE Autonomy Level 4. Baidu has stated that it will be completely driverless or SAE Autonomy Level 5 by 2025 or sooner.

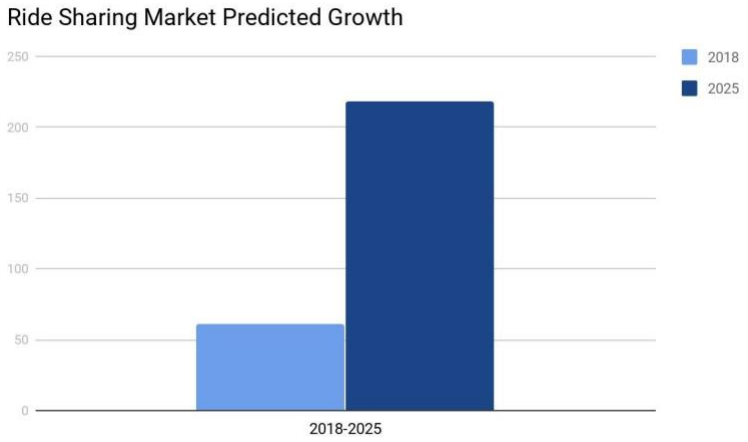
Along with these well positioned companies many other competitors are also investing and developing their own self-driving technology. Many traditional car manufacturers such as Nissan, Toyota, Honda, Renault, and BMW are developing their own or partnering with Tech companies to enter the market. Many giant Tech companies like Apple, Samsung, Nvidia and Microsoft are also planning to enter the market.

The Ride Sharing Market

The ride sharing market is the market of services offered by firms that enable individuals to transport by offering them or supplying them with a medium of transportation, normally an automobile. This market can be divided into three market segments: e-hailing (29% of the total market), car sharing (66% of the total market)and car-rental (5% of the total market). The e-hailing market segment is characterized by the use of virtual devices, such as a smartphone, that enable riders to meet with drivers.

Car-sharing is a shared use of mobility, or in other words, consumers with different final destinations using the same transportation method to get to their endpoint. Car rental, as implied by its name, is the renting of an automobile for shorts periods of time. All of these market segments are expected to grow with the ride sharing market, as a whole, forecast to grow by at least 19% compounded annual growth rate form 2018-2025 (Exhibit 3).

(Exhibit 3) Ride Sharing Market Predicted Growth



*CAGR = 19.87, 2018 = 61.3 billion

Factors Influencing Growth

- Connectivity
    - More than 44% of the entire world population possess a smartphone as of 2020. This access to the internet enables individuals to enter the e-hailing market and allow drivers to use tracking systems such as GPS that improve the overall ride experience.
- Increase Cost in Car Ownership
    - The rise in cost of ownership of a car, which includes but is not limited to up-front cost, gasoline, maintenance, insurance, among others, has risen in recent years. The fact that nowadays less people can afford to buy a car makes ride sharing services a necessity to a large number of consumers in their everyday lives.
- . Environmental Awareness
    - Practices such as car-sharing reduce the amount of CO-2 released to the environment per kilometer of travel. Nowadays, with people increasingly aware of the practices that affect our environment, many consumers are switching to ride sharing services to alleviate their carbon footprint.
- Resistance from Traditional Transportation Methods
    - The first negative factor that contributes negatively in this list is this. As ride sharing services have emerged in the scene, traditional taxi operators have opposed the change as it reduces their revenues and potentially even takes their jobs. This movement has caused a bad reputation to predominantly platforms that enable e-hailing.

- Governmental Policies
    - In many countries, e-hailing and to an extent, car-sharing has been banned to protect the local taxi industries. These policies have obviously affected the growth rate of the market.

Major Competitors

Given that everything signals that Zoox wants to enter the e-hailing market segment, and potentially also the car-sharing market segments if it enables features in its platform that enable two different consumers with different needs to use the same automobile in order to reduce consumer costs, its main competitors would be Uber and Lyft.

Uber

Uber's $7.3B autonomous driving division was called Advanced Technologies Group (ATG) and it was spending about $20M per month as of 2016.. An important explanation for why Uber is so focused on autonomous driving is the cost saving they would get from not having human drivers. Human drivers make up almost 80% of the company's costs per ride. Uber planned to have at least 75,000 self-driving vehicles on the roads by 2019 and to set up robo-taxi services in at least 13 cities by early 2022. However they have fallen short of their first milestone as by April 2019 they only had 250 cars in operation. Back in August 2018, they announced that they would receive a $500M investment from Toyota and together the companies would jointly work on the development of autonomous cars. However, in June 2019, they unveiled a brand new autonomous driving car model which they developed in partnership with Volvo. This new model has more safety features and is designed to operate in SAE level 5 (without a human driver). Uber states that this model will begin testing on roads in 2020. Since then Uber has managed to secure new investments for the program and raised $1B in total, $667M from Toyota and Denso Corp and $333M from SoftBank.

Lyft

The autonomous vehicles of Lyft have driven nearly 43,000 miles in self-drive mode during 2019, which is a major improvement from 2018 and a significant confidence boost for them. However, they still need to keep developing their software and testing in order to catch up with the leaders in the autonomous car industry. A major part of their journey in the self-driving industry was the partnership they signed with Aptiv. The companies planned to combine Aptiv's self-driving vehicles with Lyft's already established network. Over 100,000 rides in cars under AI driving mode were the results from this partnership. However, these cars had a backup driver upfront just in case there were any serious situations and the cars weren't in autonomous mode inside parking spaces or around lobby areas in hotels . Lyft had presented their SAE Level 5 program in 2017 and it has grown since then . The Level 5 program currently has over 400 employees in the US, London and Munich. They plan to keep developing and testing their software on their own closed-course track that is situated in East Palo Alto. This testing area can be adjusted into highways or crossroads or traffic light stops in order to properly test the vehicles.

Zoox's Products

Zoox had been working towards developing the software and hardware necessary to construct a safe autonomous mobility platform. The company had innovated self-driving custom built EV which would be controlled by smartphones.

Zoox's EV

The secretive company hasn't disclosed much information with regards to their ground up vehicle other than it would have the latest technology with regards to robotics and renewable energy, in its design would be symmetrical and bidirectional. In addition to that, and to the fact that the company sells its car to be a 'zero-emissions' automobile, it's suspected that the car's final design and features would rely heavily on the autonomous driving software and hardware that the car would need to have a Level-5 autonomy level.

Autonomous Driving Software

Zoox's vehicles see surrounding through computer vision technologies. The sensors provide the car with data and images which are used to detect and avoid objects such as vehicles, pedestrians, and traffic lights. Not only do the cars detect the listed objects, but they predict future actions of these road objects by a software framework that integrates domain-specific rules, Physics-based modeling and Data-driven machine-learned behaviour modelling. The Domain-specific rules is where the software takes the vehicle's situation into account, such as the car's direction. The Physics-based model represents the car to determine where an object will be given its speed, such as a car's direction and speed. Data-driven machine-learned behaviour modeling interprets human behaviour to anticipate actions of surrounding objects, such as a car suddenly changing direction). Zoox's planning methodology plans out a path for the vehicle by predicting what other road objects will do, enabling the vehicle to go where they need to. With the centimeter-level localization software, the vehicles are aware of where they are located at all times and Zoox has been currently developing its own mapping technology. If the vehicle is ever stuck or stops, it will contact an operations centre and the operator will help unblock the vehicle.

Sensor Suite

The company's vehicle design sensor suite uses a combination of RGB (red, blue, and green) cameras, lidar (light detection and ranging), radar (radio detection and ranging) and proprietary sensors. Individual vision sensors could see up to 270 degrees, and the car retains a 360-degree view of the surroundings through a multi-sensor suite. The 360-degree view increases detection of other drivers, pedestrians and far or near objects in all directions. In addition, the company's model has four-wheel steering, which provides more accuracy compared to the traditional two-wheel steering. It is also known to have a dual power train and dual batteries. Ideally, this will minimize trips back to the charging stations

Furthermore, the lidar sensors assist in building a live 3D representation of the vehicles' surroundings. They send a beam of light to the object and once the object encounters the beam, the light reflects back towards the sensor (laser return). With this the computer is able to calculate the distance between the sensor and object. Thus, the vehicle displays a 3D image of the surroundings and confirms the accuracy by multiple sensors calibrating with one another. Zoox's radar sensors detect objects, which essentially measure the distance of an object and its velocity. These sensors send a short burst of electromagnetic radio waves, measuring the time it takes to return and work well in difficult weather and lighting conditions. The usage of multiple cameras is to cover a variety of ranges and views. Moreover, they provide color perception of video images allowing machine learning algorithms to classify objects by

category. These algorithms also contend with fraught environments, such as a construction zone. This is done by drawing out visual data and mapping new paths around obstacles. However, cameras are the only sensor that can identify the state of traffic lights.

Safety of Zoox Vehicle

Zoox uses multiple test vehicles which includes Toyota Highlanders and Prius C's and these vehicles meet applicable Federal Motor Vehicle Safety Standards. The company has two operators in the vehicle at all times and test drive in all types of weather and road conditions. Vehicles are driven on private roads, test tracks and public roads to confirm the safety of them. All vehicle operators are required to go through a safety training program, must undergo a detailed screening procedure and get over 150 hours of training before being certified to drive. The training includes driving school, safety training, incident response training, software operations training, autonomous driving and public road testing. Furthermore, Zoox ensures their vehicles operate safely through an operational design domain (ODD). ODD verifies the vehicles follow traffic laws, speed ranges and maneuvers weather conditions.

Consumer Reaction to Zoox's Vehicle

Ashlee Vance, an American journalist and author, had gone for a 10 minute test drive with the co-founder and CEO of Zoox, Tim Kentley-Klay. They started off by summoning a car with Zoox's app and within a couple minutes, a Toyota Highlander arrived. The vehicle had a roof full of sensors and a trunk filled with computers and the passenger cabin had screens displaying what the car could see. All that had to be done was one tap to get the vehicle moving and merge onto the road.

Two operators were sitting in the front, while one had hands on the wheel at all times. Although there was some human intervention, Ashlee says "But the humans were never summoned during my test. This was a 100 percent robot affair." He adds that the screens were filled with information such as the colours, speed, location and identification of different objects. For example, buildings were shown as gray, cars as purple, stop lights as pink and pedestrians as orange. Furthermore, he recognized the software was able to tell the difference between two individuals on different vehicles going around the same speed and was cautious of car spacing.

He observed that the vehicle handled left turns and four-way stop signs very well. At the left turn, the car was steady and made sure all pedestrians had crossed before proceeding to turn. The vehicle knew exactly when to proceed moving upon arriving at a stop sign, had a brief pause and then continued to move. Ashlee states "The Zoox vehicle behaves much as one guided by a human world. It follows the car in front at a safe distance and observes the actions going on around it." But, one thing he noticed was that the car seemed to stop abruptly compared to when a human driver would stop.

Apart from how great the car ride was, "The bummer, of course, is that there's little more to say about how close Zoox is to its ultimate goals. My ride took place in a modified Toyota-not one of the company's homemade, futuristic cars," says Ashlee. He believes Zoox needs to continue to raise money, manufacture their own vehicles, hire more engineers and excel in self-driving technology.

Amazon

Starting up as a large bookstore, Amazon.com Inc. has developed into an amazing online shopping experience and largest online retailer with selling a variety of products. They sell clothing, books, movies, office products, pet supplies and much more. The company has its own video streamer, cloud service, grocery food chain and digital devices. Its three segments are North America, International and Amazon Web Services (AWS). The North American segment sells through retail stores, grocery stores and websites (includes subscriptions). Internationally, Amazon sells its services and products through websites and through AWS it earns revenue from cloud, database and other services. Apart from these three segments, Amazon also gains revenue from third party sellers on its site.

The company sales increased by more than 160% since 2014. With an increase in all three segments, Amazon went from a net income of $10,073.00 million in 2017 to $11,588.00 in 2019. In general, the company sales have increased more than the operating expenses have over the years. One of the ways Amazon has tremendously grown is through acquiring other companies. So far, Amazon has acquired companies such as PillPack, Whole Foods Market, Eero and now Zoox.

Amazon consumers have been rising greatly over the years. With the use of AI within its systems, the company is able to collect data which includes product search ranking, merchandising placements, fraud detection etc. The website allows consumers to sign up for memberships such as Amazon Prime. This specific membership allows consumers to receive their order within the same or two days. Amazon continues to grow in the industry with market research, membership options, delivery services and more.

Amazon in the Autonomous Driving Sector

Amazon’s acquisition of Zoox hasn’t been the only investment amazon has had in the autonomous driving sector. In February 2019, Amazon invested $530 million in the self-driving start-up Sequoia Innovation Inc. valued at more than 2.5 billion. Currently, the company has partnerships with Volkswagen AG, Hyundai Motors Co. and Byton Ltd. for hardware and software developments in the self-driving vehicle industry.

Conclusion

Zoox was only able to survive the pandemic solely because it got acquired by Amazon, which also means that Amazon will provide Zoox with the necessary funding so that the company continues its research and staff.

However, there were still many investors that couldn’t make sense out of this transaction. They asked themselves, why would Amazon buy Uber's new competitor? Why not acquire a more dominant company in the AV market? And most importantly, what are Amazon’s intentions with this purchase?

Exhibit 4 EV Usage in Different Consumer Segments in 2020

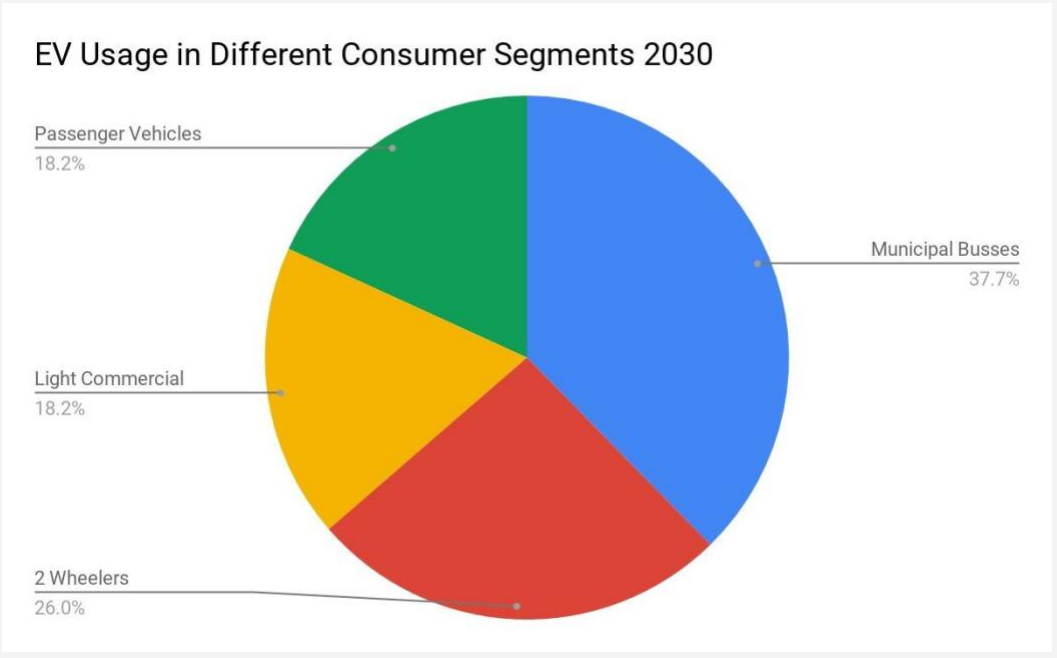
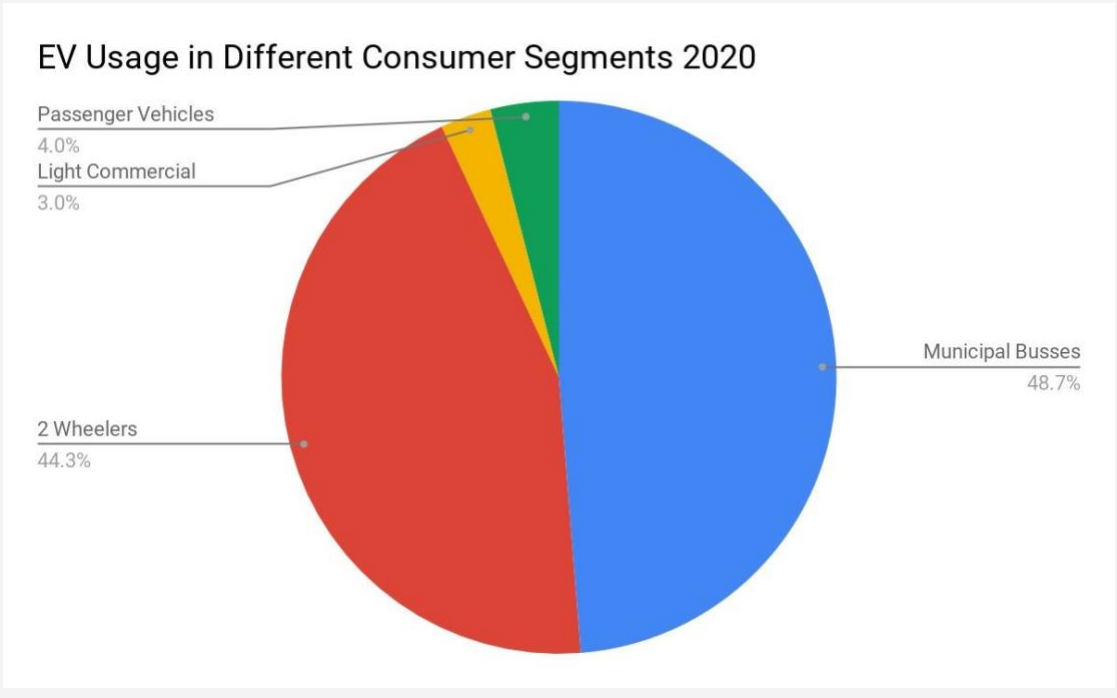


Exhibit 5 EV Usage in Different Consumer Segments in 2030

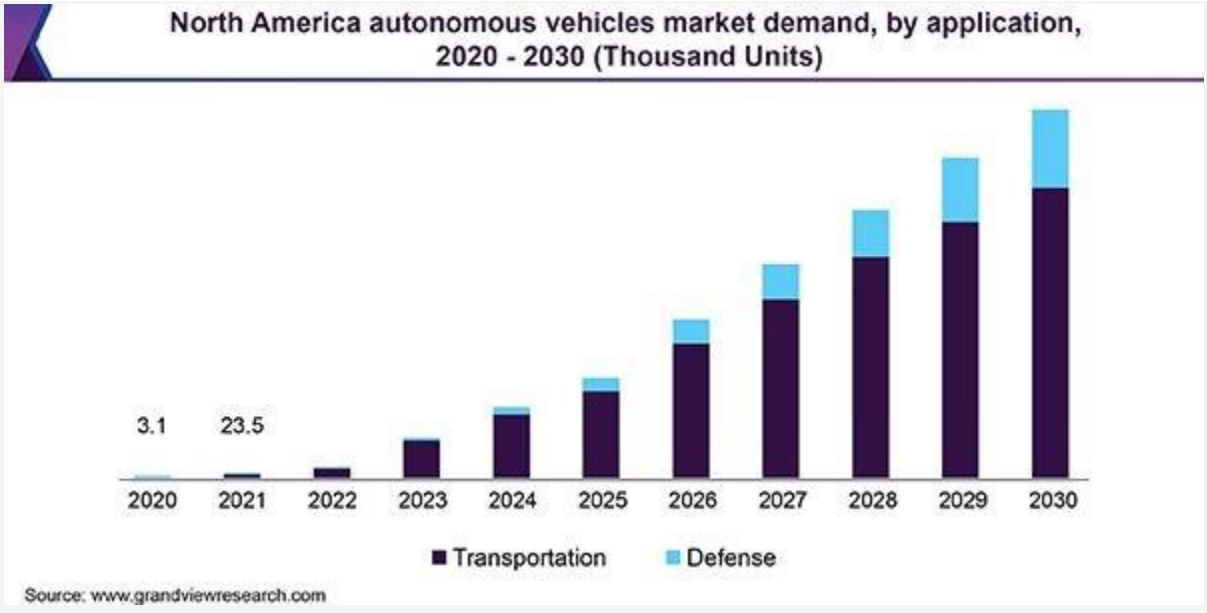


*2 wheelers include but are not limited to: motorcycles, scooters and mopeds.

Exhibit 6 Predicted EV Growth WorldWide

	2020	2025	2030	2040
EV Car Sales	1.7M	8.5M	26M	54M
EV Share of Car Sales	2.7%	10%	28%	58%
Size of Global EV Fleet	8.5M	N/A	116M	N/A
Global Vehicle Fleet	1.2B	N/A	1.4B	N/A
Share of Total km used in Shared Mobility applications	54B	N/A	1880B	4250B

Exhibit 7 Predicted Autonomous Vehicles Growth in Demand in North America



*CAGR = 63.1 (2020-2030)

Exhibit 8 Amazon's Income Statement and Balance Sheet

	Year Ended December 31,				
	2015	2016	2017 (1)	2018	2019
	(in millions, except per share data)				
Statements of Operations:					
Net sales	$ 107,006	$ 135,987	$ 177,866	$ 232,887	$ 280,522
Operating income	$ 2,233	$ 4,186	$ 4,106	$ 12,421	$ 14,541
Net income (loss)	$ 596	$ 2,371	$ 3,033	$ 10,073	$ 11,588
Basic earnings per share (2)	$ 1.28	$ 5.01	$ 6.32	$ 20.68	$ 23.46
Diluted earnings per share (2)	$ 1.25	$ 4.90	$ 6.15	$ 20.14	$ 23.01
Weighted-average shares used in computation of earnings per share:					
Basic	467	474	480	487	494
Diluted	477	484	493	500	504
Statements of Cash Flows:					
Net cash provided by (used in) operating activities (3)	$ 11,909	$ 17,203	$ 18,365	$ 30,723	$ 38,514

	December 31,				
	2015	2016	2017	2018	2019 (4)
	(in millions)				
Balance Sheets:					
Total assets	$ 64,747	$ 83,402	$ 131,310	$ 162,648	$ 225,248
Total long-term obligations	$ 17,477	$ 20,301	$ 45,718	$ 50,708	$ 75,376

Works Cited

Amazon. “We're Acquiring Zoox to Help Bring Their Vision of Autonomous Ride-Hailing to Reality.” *US Day One Blog*, Amazon, 26 June 2020, blog.aboutamazon.com/company-news/were-acquiring-zoox-to-help-bring-their-vision-of-autonomous-ri de-hailing-to-reality.

“Amazon.com, Inc.: Company Profile.” *Vault* , www.vault.com/company-profiles/retail/amazoncom-inc.

Bayern, Macy. “The Top 3 Companies in Autonomous Vehicles and Self-Driving Cars.” *ZDNet* , ZDNet, 4 Nov. 2019, www.zdnet.com/article/the-top-3-companies-in-autonomous-vehicles-and-self-driving-cars/.

Brown, Eliot. “After the Smartphone: The Race for the Next Big Thing.” *The Wall Street Journal* , Dow Jones & Company, 11 Jan. 2019, www.wsj.com/articles/after-the-smartphone-the-race-for-the-next-big-thing-11547245999.

“BNEF EVO Report 2020: BloombergNEF: Bloomberg Finance LP.” *BloombergNEF* , about.bnef.com/electric-vehicle-outlook/.

CB Insights. “Autonomous Vehicles & Car Companies l CB Insights.” *CB Insights Research* , CB Insights, 26 June 2020, www.cbinsights.com/research/autonomous-driverless-vehicles-corporations-list/.

Columbus, Louis. “Using Patent Analytics To See Why Amazon Bought Zoox.” *Forbes* , Forbes Magazine, 12 July 2020, www.forbes.com/sites/louiscolumbus/2020/07/12/using-patent-analytics-to-see-why-amazon-bought-zoo
x/.

Defense Advanced Research Projects Agency, www.darpa.mil/about-us/timeline/darpa-urban-challenge.

Etherington, Darrell. “Amazon to Acquire Autonomous Driving Startup Zoox.” *TechCrunch*, TechCrunch, 26 June 2020, techcrunch.com/2020/06/26/amazon-to-acquire-autonomous-driving-startup-zoox/.

Even Implants in the Brain." *Wall Street Journal (Online)*, Jan 11 2019, *ProQuest.* Web. 8 Aug. 2020

Granath, Erika. “5 Top Autonomous Vehicle Companies to Watch in 2020.” *Insights.com*, MES-Insights.com, 4 Mar. 2020, www.mes-insights.com/5-top-autonomous-vehicle-companies-to-watch-in-2020-a-910825/.

Hawkins, Andrew J. “Zoox, Citing COVID-19 Shutdown, Lays off Its Autonomous Vehicle Backup Drivers.” *The Verge*, The Verge, 6 Apr. 2020, www.theverge.com/2020/4/6/21210000/zoox-layoff-coronavirus-self-driving-car-safety-drivers.

Higgins, Tim. "SoftBank Invests $940 Million in Nuro for Driverless Deliveries; Startup is Building Robotic Vehicles to Deliver Groceries and Other Items from the Street." *Wall Street Journal (Online)*, Feb 11 2019, *ProQuest.* Web. 8 Aug. 2020 .

Higgins, Tim. "Zoox's New Chief Hails from Intel." *Wall Street Journal,* Eastern edition ed., Jan 15 2019, *ProQuest.* Web. 8 Aug. 2020 .

Higgins, Tim, and Rolfe Winkler. "Startup Zoox's Valuation Surges." *Wall Street Journal,* Eastern edition ed., Nov 08 2016, *ProQuest.* Web. 8 Aug. 2020 .

Hull, Dana. “Self-Driving Dream Team Gets $530 Million from Sequoia, Amazon.” *The Economic*

Times,

Economic Times, 8 Feb. 2019, economictimes.indiatimes.com/small-biz/startups/newsbuzz/self-driving-dream-team-gets-530-million-f om-sequoia-amazon/articleshow/67895121.cms?from=mdr.

Kelo, Ari. “Data: Americans Care Less About The Environment Than The Rest Of The World.”

TheRising, 28 Apr. 2020, therising.co/2019/09/05/americans-are-less-concerned-about-the-environment/.

Lombardo, Cara, and Tim Higgins. "Amazon in Advanced Talks to Buy Self-Driving-Car Tech Company

Zoox; Deal Expected to Value Zoox at Less than its Last Private Valuation." *Wall Street Journal (Online),* May 27 2020, *ProQuest.* Web. 8 Aug. 2020 .

Lombardo, Cara, and Tim Higgins. "Amazon Seeks Robot-Taxi Maker --- Zoox is Developing Technology for Electric-Powered Cabs Summoned by Phones." *Wall Street Journal,* Eastern edition ed., May 27 2020, *ProQuest.* Web. 8 Aug. 2020 .

Rangwala, Sabbir. “Amazon's Zoox Acquisition– Is LiDAR Next?” *Forbes*, Forbes Magazine, 1 Aug.

2020, www.forbes.com/sites/sabbirrangwala/2020/08/01/amazons-zoox-acquisition-is-lidar-next/.

“Ride Sharing Market.” *Market Research Firm*, www.marketsandmarkets.com/Market-Reports/mobility-on-demand-market-198699113.html.

“Road Safety Facts.” *Association for Safe International Road Travel*, 13 Apr. 2020, www.asirt.org/safe-travel/road-safety-facts/.

Roberts, Graeme. "GM's Cruise After Zoox Engineers - Report." *just - auto global news*, Jun 05 2020, *ProQuest.* Web. 8 Aug. 2020 .

Savitz, Eric J. "Amazon Buys Autonomous Taxi Company Zoox. Look Out, Uber and Lyft." *Barron's (Online)* (2020)*ProQuest.* Web. 8 Aug. 2020.

“The 6 Levels of Vehicle Autonomy Explained.” *Synopsys Automotive*, www.synopsys.com/automotive/autonomous-driving-levels.html.

Vance, Ashlee. “Zoox Gives First Look at Startup's Mysterious Robotaxi.” *Automotive News*, 13 Nov. 2019, www.autonews.com/zoox-gives-first-look-startups-mysterious-robotaxi.

Weise, Karen, and Erin Griffith. “Amazon to Buy Zoox, in a Move Toward Self-Driving Cars.” *The New York Times*, The New York Times, 26 June 2020, www.nytimes.com/2020/06/26/business/amazon-zoox.html.

"Welcome to My.access -- Please Choose How You Will Connect." *My.access - University of Toronto Libraries Portal*, global-factiva-com.myaccess.library.utoronto.ca/pcs/default.aspx.

Wiggers, Kyle. "Zoox CEO Explains What Makes the Company's Self-Driving Cars Better: Four-Wheel Steering, Big Batteries, AI." *VentureBeat*, VentureBeat, 7 June 2019, venturebeat.com/2019/06/06/zoox-ceo-explains-what-makes-the-companys-self-driving-cars-better-fourwheel-steering-big-batteries-ai/.

"Zoox - Crunchbase Company Profile & Funding." *Crunchbase*, www.crunchbase.com/organization/zoox.